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IN PARTNERSHIP WITH KEAN UNIVERSITY & KEAN UNIVERSITY'S
INSTITUTE OF URBAN ECOSYSTEM STUDIES

RESULTS AND FINDINGS FOR BIO-BLITZ 2008

A 24-hour intensive effort to measure biodiversity

*Elizabeth River Parkway in Elizabeth, Union & Hillside,
Union County, NJ*



MARK YOUR CALENDARS!
BIO-BLITZ 2009 * JUNE 12 & 13, 2009
5:00 PM TO 5:00 PM

BIO-BLITZ 2008

Why did we do it and what does it all mean?



Why?

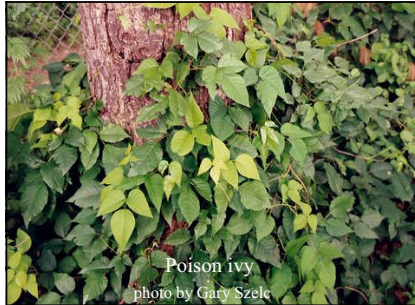
On June 13 & 14, 2008, 10 teams of scientists and naturalists, totaling approximately 140 people, scattered along Union County's Elizabeth River Parkway in search of plant and animal life. The Elizabeth River Parkway is a roughly 312 acre linear park consisting of salt marsh, wetland, woodland, and riparian habitats within Elizabeth, Union and Hillside. The Parkway was selected as the site for Bio-Blitz 2008 because, although it is surrounded by urban/suburban development, visitors feel insulated from the "rat race" and connected to the natural beauty and serenity of the area. The Elizabeth River Parkway It is a perfect example of how urban green spaces can provide a haven for both people and wildlife in the midst of a busy landscape. The Elizabeth River Parkway, acquired in the 1930s as a mostly passive use park, is an important link in a chain of historically important parks that form a greenway along the Elizabeth River watershed and serves as a key "corridor" for travelling wildlife.

What?

A Bio-Blitz is a 24-hour intensive effort to measure the biodiversity (species richness) of a natural area. Bio-Blitzes are often conducted in urban parks and green spaces. As home to the fifth oldest county park system in the nation, Union County is proud of its ecologically diverse and historically rich parkland. In 2005, the county began a systematic survey of its parks through the annual Bio-Blitz. Bio-Blitz 2008 was held along the Elizabeth River Parkway. Union County in partnership with Kean University and the Institute of Urban Ecosystem Studies (IUES) raised awareness of the diversity of life in this urban park and the importance of preserving and managing such places as essential wildlife habitat. Throughout the evening of June 13th and the following day, scientists, expert naturalists and amateurs raced to sample and identify as many plant and animal species as possible.

RESULTS

*In all 570 species of plants and animals were identified during the 24-hour event.
Following is a breakdown of what each team found.*



Plants: The plant team consisted of 16 volunteers led by **Dr. Daniela Shebitz**, Department of Biological Sciences, Kean University, including Kean University students and staff, local high school teachers, a local librarian and Brooklyn Botanic Garden staff. One group of volunteers went out on Friday evening to identify plants, and the Saturday volunteers were divided into two groups. The total number of plant species identified were **174**. Since roads throughout the urban Elizabeth River Parkway provide the means for invasive species seeds to spread, most of what was found consisted of non-native species. Many of these species have become invasive in the area, such as Japanese knotweed (*Polygonum cuspidatum*), common reed (*Phragmites australis*), garlic mustard (*Alliaria petiolata*), common mugwort (*Artemisia vulgaris*), Japanese stilt grass (*Microstegium vimineum*), tree of heaven, (*Ailanthus altissima*), and Japanese honeysuckle (*Lonicera japonica*). However, There were many native plant species along the Parkway. The team was happy to see healthy populations of spicebush (*Lindera benzoin*), honewort (*Cryptotaenia Canadensis*), clearweed (*Pilea pumila*), common dogbane (*Apocynum cannabinum*) and jack-in-the-pulpit (*Arisaema triphyllum*).

Micro-Fungi: A team led by **Dr. Eric Boehm**, Department of Biological Sciences, Kean University, included Dr. Boehm's summer research students who set out to determine the biodiversity of ascomycetous microfungi. They found **13** species. Although these fungi are small, ~1mm in length, they play a vital role in the decomposition of lignin and cellulose. The team focused on the family *Hysteriaceae*, the group that Dr. Boehm specializes in. These organisms are remarkably successful, as attested to by the fact that they can be recovered from the bark and wood of many trees, both living and dead. On this occasion the following members of the *Hysteriaceae* were collected and determined to species: *Hysterium pulicare* Pers. : Fr., *Hysterium angustatum* Alb. et Schw., *Hysterographium mori* (Schw.) Rehm, and *Psiloglonium clavisporem* (Seaver) Boehm, Schoch & Spatafora. Details of this group of fungi can be found on-line at: <http://www.eboehm.com/>.





Fungi, (*Amanita vaginata*), photo
By Linda Brazaitis

Macro-Fungi: The Mycology team for macro-fungi was represented by co-chairs **Marc Grobman** and **Dorothy Smullen**, plus Melanie Spock, all members of New Jersey Mycological Association. They recorded **28** species during the blitz as well as 5 others identified to the genus level (one *Agrocybe* sp. and 4 other *Russula* spp.). Specimens were collected in section D which was wooded and near Bio-Blitz Central. It was rather dry for mushrooms and June is not the best time of year for fungi diversity. "For this early in the year, and following a dry spell, it was a good assortment of finds," Grobman said.



Dr. Teasdale & Dr. Sheblitz prep team
members from Elizabeth High School photo by
Betty Ann Kelly

Algae and Mosses: The algae and mosses team led by **Dr. Brian Teasdale**, Department of Biological Sciences, Kean University, identified **12** species in total. Although algal species can be found in a wide range of forms (unicellular, colonial, or multi-cellular) the algal group decided to concentrate on the larger multicellular forms for this BioBlitz. Algae are a primary component to the net photosynthesis that occurs on our planet (contributing up to 60% of the oxygen we breathe). The collected samples that were identified to species level consisted of: *Bryopsis plumosa*, *Fucus vesiculosus*, *Enteromorpha intestinalis*, and *Ulva lactuca*. The following collections of both algae and mosses were identified to genus level: *Calithamnium*, *Ceramium*, *Cladophora*, *Fontinalis*, *Atrichum*, *Thuidium*, *Brachythecium*, and *Grimmia*. Many of the algal species identified are indicator species of high eutrophication.



Dragonfly, Halloween pennant,
photo by
Betty Ann Kelly

Insects: **Dr. Sylvio Codella**, Department of Biological Sciences, Kean University, and his students at Kean University, have participated in the Union County Bio-Blitz since its start in 2005. More generally, they have been sampling *Hymenoptera* (wasps, ants, bees) in the County's green spaces for over eight years and have documented the presence of hundreds of species. This year, they sampled at Mattano Park, Lightning Brook, and Woodruff Sections of the Parkway. They collected **122** species of *hymenopterans*, including several small parasitic wasps not previously recorded in Union County. In addition, Anthony Deczynski collected **129** species of beetles (*Coleoptera*), moths (*Lepidoptera*), grasshoppers (*Orthoptera*), and other groups. In total, the Insect Team collected **251** species. In general, insect diversity was greater in areas with high native plant diversity.

Aquatic Invertebrates: The Aquatic Invertebrates team, led by **Kristin Beebe**, an AmeriCorps watershed ambassador from the New Jersey Department of Environmental Protection, consisted of



ten watershed ambassadors from different regions of New Jersey and two members from the AmeriCorps Water Watch Program. The team collected **26** different species over the 24-hour period. Multiple samples were taken at each section of the Elizabeth River Parkway using kick seine and D-frame nets both Friday evening and all day Saturday. The Elizabeth River is tidal and brackish in parts, so the team was able to find some salt water species that had not been found in previous Bio-Blitzes, such as mud crabs (*Eurypanopeus depressus*), fiddler crabs (*Uca pugliator*), shore shrimp (*Palaemonetes vulgaris*), and juvenile blue claw crabs (*Callinectes sapidus*). The team was happy to

also find some fresh water species that are indicators of good water quality in the river, including mayfly larvae (*Heptageniidae* family), caddisfly larvae (*Hydropsychidae* family), and crayfish (*Cambaridae* family).

Amphibians and Reptiles: Friday night's *Frog Slog*, a public program, took place in a pond behind Liberty Hall Museum. Team leaders **Cathy Eser** from the Staten Island Zoo and **Karen Inzillo** from Trailside Nature and Science Center were joined by other scientists, students, and the general public while they dipped their nets into the pond to fish out some "herps" (reptiles and amphibians) specimens. Adult bullfrogs, *Rana catesbeiana*, along with their large tadpoles, a large snapping turtle, *Chelydra serpentine*, an adult and a yearling painted turtle, *Chrysemys picta*, were found. The next day, the herps team set out early in an attempt to find some more species by randomly searching



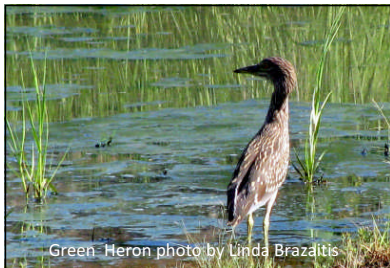
the Salem Section and trying to see animals basking in the morning sun. Through observation a garter snake, *Thamnophis sirtalis*, and several bullfrogs were counted. The team then searched the stream for larval salamanders and frogs, but none were found. Amphibians are often referred to as "indicator species", and their absence from the stream tells us about the water quality (poor, good, or excellent). The only other species of amphibian found was the Redback Salamander, *Plethodon cinereus*, that does not rely on the stream as part of its reproductive cycle. There were also no fishless vernal pools for amphibians to breed in. In total, only **5** species of reptiles and amphibians were found. These low numbers may be attributed to the very urban nature of the park.



Pumpkinseed sunfish photo by Linda Brazaitis

Fish: Shawn Crouse, from the New Jersey Department of Environmental Protection, Division of Fish and Wildlife, and Steve Jandoli, NJDEP Green Acres Program, and their team, sampled the Elizabeth River and Lightning Brook using a variety of sampling methods, including electro-shocking (using mild electrical currents to temporarily stun the fish for easy capture and identification), and seining.

Of the **10** species encountered, 7 are native to New Jersey waters (pumpkinseed, brown bullhead, white perch, American eel, banded killifish, and mummichog), while 3 species are non-native (green sunfish, common carp, and goldfish). These common species are tolerant of environmental degradation and reflect the extensive urban and suburban landscapes in the Elizabeth River watershed. The fish team also conducted a three-part riverside public presentation at the Salem Section of the Parkway. It consisted of an introduction to fisheries resources, a fish collection demonstration, (including the use of a backpack electrofishing unit and a 20 ft. seine) and a summary of fishes encountered and field identification.



Green Heron photo by Linda Brazaitis

Birds: For the birding team, led by Ed Zboyan and Frank Budney, there were two main areas of interest: Kawameeh Marsh and Lightning Brook Park. A total of **59** species of birds were sighted and identified in all, throughout the Bio-Blitz.

The part of the marsh that was explored was species-rich. In the morning, an Osprey was sighted in the marsh, this being quite a find during June, as they are far more likely to be seen in the fall in such an urban environment.

Lightning Brook Park also yielded some very interesting observations. Once an industrial site, today it is used mostly for softball and other sports, with few people venturing into the woods. There are no formal trails at present; however, during the 1950's a pedestrian trail linked Lightning Brook to other sections of the Elizabeth River Parkway. The Parkway and the river itself serve as a food source providing fish, insects and berries for the avian population, allowing for an active bird life in the area. The Baltimore oriole and yellow warbler were among those seen. This greenway park serves the migratory bird population as an excellent stopover during their trip north in the spring.



Environmental Modeling Bio-Blitz 2008

Water quality was evaluated at ten sites along the Elizabeth River and some of its tributaries. Two sites we pH, dissolved oxygen and ORP were measured using a multi-probe system, the YSI 556 MPS. The dissolved oxygen was considered unreliable. The table on the following page includes the site locations and the water quality

| Location | Temperature (Celsius) | Conductivity (mS/cm) |
|-------------------------------|-----------------------|----------------------|
| Conant St. Bridge | 22.8500 | 0.8220 |
| RT. 22 bridge | 19.2800 | 0.8870 |
| Styvesant/Oakland Ave. bridge | 22.5000 | 0.6510 |
| Lightning Brook | 21.7000 | 0.6880 |
| GS Parkway | 21.7000 | 0.8830 |
| Union Ave II, Eliz. River | 20.7400 | 0.8960 |
| East Campus Bridge | 23.4500 | 0.8190 |
| Ursino Lake, North Ave | 24.1300 | 0.8170 |
| Fifth St/ Mattano Park | 21.7300 | 24.6800 |
| Elizabeth Marina | 21.6300 | 32.6300 |

The acceptable level for pH, to support a diverse ecosystem, in a fresh water stream is 6.5-8.0 (Standard 1 was 7.3960 which is within the EPA criteria for a healthy stream. The only site close to the threshold (pH= outfall pipe enters the stream near the sampling site.

The acceptable level for conductivity to support a diverse ecosystem in a fresh water stream is 0.150-0.500 mS/cm (www.epa.gov/volunteer/stream/vms50.html). Conductivity indicates the amount of dissolvable substances in the water. The average (arithmetic mean) for the eight fresh water sites was 0.8079 mS/cm, within the range of Mattano Park (24.68mS/cm) and the Elizabeth Marina (32.63mS/cm) are typical of brackish (part fresh part salt) water. We have begun collecting this data to help evaluate invasive species in the estuarine environment.

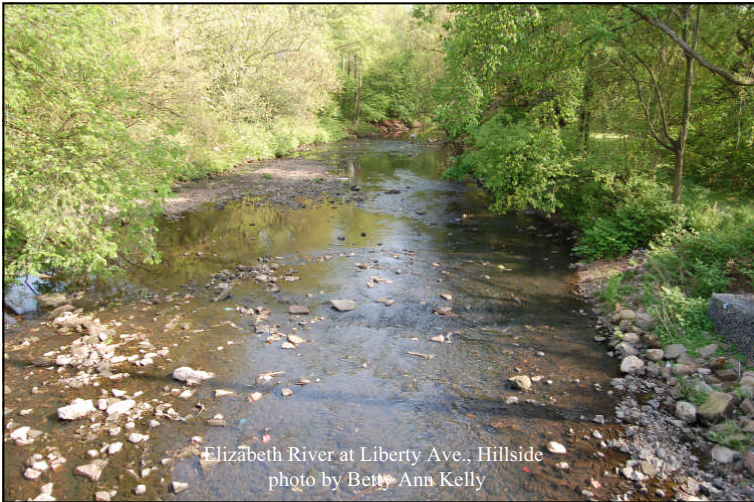
Environmental Modeling Bio-Blitz 2008

ure in the estuarine environment and 8 sites in fresh water fluvial environment. Temperature, conductivity, d oxygen and ORP measurements are not reported because the values were outside realistic expectations r variables.

| 5/cm) | pH (STD Units) | Latitude | Longitude |
|--------------|-----------------------|-----------------|------------------|
| | 7.3500 | 40.6899 | -74.2378 |
| | 7.2900 | 40.6978 | -74.2465 |
| | 7.7300 | 40.7060 | -74.2607 |
| | 7.5200 | 40.7033 | -74.2520 |
| | 7.6400 | 40.7041 | -74.2471 |
| | 7.3700 | 40.7072 | -74.2472 |
| | 7.5900 | 40.6809 | -74.2270 |
| | 7.5000 | 40.6775 | -74.2254 |
| | 6.6400 | 40.6575 | -74.2006 |
| | 7.3300 | 40.6467 | -74.1855 |

Units) (www.epa.gov/volunteer/stream/vms50.html). The average (arithmetic mean) for pH at all 10 sites 6.64) was in the estuarine environment near Mattano Park and should be evaluated in the future. A large

0 mS/cm (microsiemens/centimeter) with streams across the nation reporting in the range of 0.050 – 1.50 instances in a stream and can be used as a non-specific surrogate for non-point source pollution and nutri- ge of values in the nation but exceeding the threshold for a healthy stream. The very high conductivity val- h part salty) estuarine environments and can not be used as a surrogate for non-point source pollution and onments and specific tolerances to salinity.



Elizabeth River at Liberty Ave., Hillside
photo by Betty Ann Kelly

For a complete species list for Bio-Blitz 2008 and past Blitzes, visit:

<http://www.ucnj.org/parks/bioblitz.html>

Special THANKS to all of our volunteers, partners, sponsors, and participants.

Cover photos (from left to right):

Elizabeth High School students sample an estuary at Mattano Park, photo by *Jonathan Phillips*;
View of the Elizabeth River, north of Mattano Park, photo by *Linda Brazaitis*; Marc Grobman of the
Macro Fungi Team talks with Children of the Earth Foundation staff, photo
by *Linda Brazaitis*

PARTICIPATING ORGANIZATIONS

Union County Board of Chosen Freeholders
Union County Department of Parks & Community Renewal
Kean University & Kean University's Institute of Urban Ecosystem Studies
with partial funding by Schering-Plough Corporation
Prize & food donations from Wild Birds Unlimited, Starbucks, & Jenkinson's Aquarium

Bio-Blitz, 2008 Committee:

Algae: Brian Teasdale, PhD, Kean University

Amphibians and Reptiles: Cathy Eser, Staten Island Zoo

Aquatic Invertebrates: Kristin M. Beebe, NJDEP/NJWAP

Birds: Ed Zboyan & Frank Budney

Chair: Betty Ann Kelly, Union Co. Parks & Community Renewal

Displays: Linda M. Brazaitis, UCPCR

Education: Sylvia Weisbrot

Environmental Monitoring: John Dobosiewicz, PhD, Kean University,
Elizabeth River/Arthur Kill Watershed Association

Fish: Shawn Crouse, NJDEP/DFW

Fungi: Macro: Dorothy Smullen & Marc Grobman, NJ Mycological Association

Fungi: Micro: Eric Boehm, PhD, Kean University

Plants: Daniela Shebitz, PhD, Kean University

Mammals: Holly Jantz, Auburn University

Insects: Sylvio Codella, PhD, Kean University

IUES: Janet Tuohy, Kean University

Public Outreach: Ada Brunner & Karen Inzillo, TNSC-UCPCR

Publicity: Tom Plante, UC Office of Public Information

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Elizabeth River/
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NJDEP Fish & Wildlife
NJDEP Watershed Ambassador Program
The Staten Island Zoo
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